

and (v) a Status column to contain information relating to the status of the transaction request, such as waiting for reply, approval reply received, denial reply received, invalid reply received, etc. Other information pertaining to a transaction may also be included in the database 123, such as date and time of the requested transaction, merchant name, merchant location, description of the purchase item, purchase amount and/or other relevant information.

[0031] As shown in FIG. 2, the transaction authorization server 122 is in communication with the cardholder information database 124 to access account information required to process transaction requests. The cardholder information database 124 includes a number of records 280-1 through 280-N, each record containing information relating to an account issued by a card provider. In one embodiment, each record 280 of the cardholder information database 124 contains (i) an Account # column 271 to store an account number for a transaction card, (ii) a Phone # column 272 to store a phone number of a mobile device assigned to receive authorization request messages, (iii) an Address column 273 to store a billing address associated with the account number, (iv) a SSN column 274 to store a social security number of the account holder, (v) a Trigger Condition(s) column 275 to store information relating to condition(s) for triggering a mobile reply authorization requirement, and (vi) an Other Acct Info column 276 to store other information relating to the account. Although FIG. 2 shows that the phone number information 272 is stored in the cardholder information database 124 along with other account information, it will be appreciated that the phone number information may be stored in another database separate from the cardholder information database.

[0032] The manager program 215 provided on the transaction authorization server 122 is configured to manage processing of transaction requests and to manage messages sent and received from mobile devices. The phone number retrieving program 225 is configured to identify a phone number of a mobile device assigned to receive an authorization request message based on the account number information included in a transaction request by searching through the cardholder information database 124. The transaction request processing program 220 is configured to perform various functions necessary for processing a transaction request, such as determining the accuracy of the information contained in the transaction request, determining the status of the account (e.g., valid account or invalid account), and/or determining if the purchase amount is within the credit limits. The message generating program 230 is configured to generate an authorization request message which provides notification of a pending transaction request and requests a reply indicating either an approval or denial of the transaction. The message analyzing program 240 provided on the server 122 is configured to examine the reply message to determine its validity and to determine whether or not the transaction is approved by a user of the mobile device based on the content of the reply message.

[0033] FIG. 3 shows general operations involved in processing an online card transaction according to an embodiment of the present invention. A user 102 of a credit card connects to an online merchant server 114 via a computing device 110, which prompts the user to input information required to carry out an electronic credit card transaction, such as the account number and expiration date of the credit

card and optionally other personal information (e.g., the name, social security number, date of birth and billing address of the authorized cardholder). Thus in block 310, the user 102 inputs the requested data into the user's computing device and sends the credit card information to the online merchant server 114 via a network connection (e.g., Internet).

[0034] It should be noted that because of transaction notification and authorization features provided by various embodiment of the present invention, some of the personal or sensitive information currently required to carry out a conventional online credit card transaction may be omitted, such as the name of the credit card holder, the billing address, the social security number and date of birth of the cardholder and the like. In one embodiment, only information required by the merchant server to carry out an online credit card transaction using the system of the present invention is the account number of a transaction card. In another embodiment, the server 122 will process a transaction request without requiring submission of one or more of the following information: (i) the cardholder's social security number, (ii) the cardholder's date of birth, (iii) the cardholder's phone number, and (iv) the cardholder's billing address.

[0035] The information sent by the card user 102 is collected by the online merchant server 114 and based on this information the online merchant server 114 or the payment server 118 generates a transaction request and forwards the transaction request to the system 120 for approval in block 320. Then in block 330, the transaction request processing program 220 on the server 122 is used to perform an initial processing of the transaction request received from the online merchant server 114. The transaction processing system 120 has an access to a cardholder information database that contains account information relating to each of its issued credit cards, such as the credit card numbers, expiration dates, billing addresses and credit limits of its cardholders. The information contained in the transaction request is compared with information included in the database to ensure that the requesting credit card is a valid account issued by the card provider and that the amount of the transaction is within the card user's credit limit.

[0036] If the requesting account is a valid account issued by the card provider, the server 122 may perform a mobile reply authorization process ("MRAP") to send a notification of the transaction and request authorization from the cardholder. The MRAP will be described more in detail with respect to blocks 340 through 390. In one embodiment, the MRAP is used to provide a notification of a pending transaction in the form of a text message to a mobile device of a cardholder and to obtain a reply message in a text message from the same mobile device indicating either approval or denial of the transaction. The MRAP begins in functional block 340 with the phone number retrieving program 225 on the server 122 retrieving a phone number of a mobile device assigned to the requesting account by searching the cardholder information database 124. In one embodiment, the phone number retrieving program 225 functions as a search engine and the information is arranged in the cardholder information database 124 such that an